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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/352,404	07/14/1999	ROBERT LOUIS CUPO	CUPO-20-2	2209

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CHRISTOHER A HUGHES
MORGAN AND FINNEGAN
345 PARK AVENUE
NEW YORK, NY   10154

EXAMINER
BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
2631	4

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/352,404	CUPO ET AL.
	Examiner	Art Unit
	Emmanuel Bayard	2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _23 March 2004_.
2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-8 and 10-22_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) _22_ is/are allowed.
6) ☒ Claim(s) _1-8 and 12-21_ is/are rejected.
7) ☒ Claim(s) _10-11_ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
       application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This is in response to amendment filed 3/23/04 in which claims 1-8 and 10-22 are

pending. The applicant's amendments have been fully considered but they are moot

based on the new ground of rejection.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as
> set forth in section 102 of this title, if the differences between the subject matter sought to be
> patented and the prior art are such that the subject matter as a whole would have been obvious at
> the time the invention was made to a person having ordinary skill in the art to which said subject
> matter pertains. Patentability shall not be negatived by the manner in which the invention was
> made.

2.   Claims 1-8, 12-21 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Okada et al U.S. Patent No 5,787,123 in view of Isaksson et al U.S.

Patent No 5,812,523.

As per claims 1, 12 and 21, Okada discloses an OFDM receiver comprising:

means for reproducing or regenerating (see fig.16 elements 161-162 and col.4, lines 23-

32) corresponds to the claimed (recovering) and sampling rf (see fig.4a elements 35, 40)

signal from a transmitter (see fig.1belement 19) into in-phase (I) and quadrature (Q)

components of a baseband signal (see col.2, lines 44-65); means for computing auto

correlation (see col.3, lines 58-60) amplitude and phase values of the I and Q components

at sample points; squaring circuits (see figs.8, 9 elements 61-62, 111-112) correspond to

the claimed (means for averaging) (see col.5, lines 20-23 and col.11, lines 46 and col.12,

lines 41-45) and saving (see fig.11b element 43, 45) the auto correlation values of the I

and Q components over L symbols; a fed back (see col.4, lines 10-17and col.5, lines 40-

48) sampling corresponds to the claimed (phase locked loop means for providing a

sample) using the averaged I and Q auto correlation values using the averaged I and Q

auto correlation values based on R= summation{ Ri(j)} as J=1 to L where Ri is the

average auto correlation, where L is the frames and Ri(j) is the auto correlation of the jth-

frame and output signal locked (see col.10, lines 22-41, 65-67) to the transmitter rf

signal; means for providing a receiver clock chain output phase locked to the transmitter

rf signal (see col.4, lines 9-13); matching means is considered as the claimed (means for

correcting) (see col.10, lines 24-59 and col.11, lines 42-43 and col.12, lines 38-40 and

col.13, lines 10-13) frequency and timing offset between the receiver and the transmitter

in the sample number.

However Okada does not teach a fed back corresponds to the claimed (phase

locked loop means for providing a sample) number indicating an **OFDM frame**

boundary and output signal locked to the transmitter rf signal and means for providing an

offset value indicative of the phase difference between the receiver and a transmitter;.

Isaksson et al teaches (phase locked loop means for providing a sample) number

indicating an **OFDM frame** boundary using the averaged I and Q auto correlation values

and output signal locked (see fig.1 and col.2, lines 55-67 and col.7, lines 34-35) to the

transmitter rf signal and means for providing an offset value indicative of the phase

difference between the receiver and a transmitter (see col.5, lines 35-65).

It would have been obvious to one of ordinary skill in the art to implement the

teaching of Isaksson et al into Okada as to achieve accurate synchronization between the

transmitter and the receiver.

As per claims 2 and 13, the receiver of Okada would include the estimating frame synchronization of the OFDM boundary of Isaksson (see fig.1 and col.2, lines 55-67) as to achieve accurate synchronization between the transmitter and the receiver.

As per claims 3, 15 and 16, Okada would include means for phase locking the transmitter and the receiver as to achieve accurate synchronization between the transmitter and the receiver.

As per claim 4, Okada would include means for estimating the transmitter and the receiver frame offset as to correct frequency error between the receiver and the transmitter.

As per claims 5 and 14, Okada teaches means responsive to the sample number and a negative angle of the auto correlation values for correcting for frequency synchronization, symbols synchronization and transmitter/receiver frequency offset (see abstract).

As per claim 6, the receiver of Okada does include means responsive to a sampling clock for generating I/Q signals (see col.4, lines 30-33).

As per claims 7 and 17, the receiver of Okada does include a means for storing (seefig.11b element 43) the sampled I/Q coupled to the auto correlation means and a matching means is considered as the claimed (means for correcting) (see col.10, lines 24-59 and col.11, lines 42-43 and col.12, lines 38-40 and col.13, lines 10-13).

As per claims 8 and 18, the receiver of Okada does include a means for storing the sampled I/Q. Furthermore implementing the storing means to be coupled to offset estimator and a frame synchronization estimator would have been obvious to one skilled

in the art as to provide an accurate synchronization between the transmitter and the receiver.

As per claim 19, Okada would include adjusting the phase angle of each sample in a storing means by an amount proportional to "n" so that the broadcast system would tie its transmitter clock directly to its receiver clock so its transmit at the same position within the slot as it receives

As per claim 20, Okada would include averaging the auto-correlation values over frames in a storage device as to provide an accurate synchronization between the transmitter and the receiver.

Allowable Subject Matter

Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 22 is allowed over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter: the present invention teaches a method for correcting timing and frequency offset in an OFDM receiver. The prior arts of Okada U.S. patent No 5,787,123, Harrisson et al U.S. Patent No 6,151,353 and Harada U.S. Patent No 5,774,450 and Isaksson U.S. Patent No 5,812,523 teach a similar method. However the above mentioned prior arts fail to anticipate or render obvious the following recited features: a phase locked loop having a means for processing the frame difference through a filter and means responsive to the filter for integrating and rounding off the frame difference to the nearest integer value and

a counter means responsive to the integer value providing a sample number for a desired frame boundary as recited in claim 22.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rakib et al U.S. patent No 6,356,555 B1 teaches an apparatus and method for digital data transmission.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.
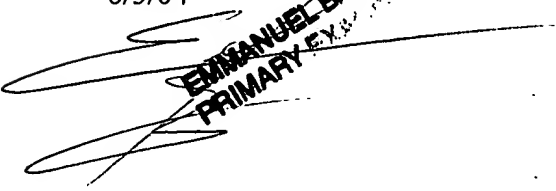
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour , can be reached on (703) 306-3034. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Emmanuel Bayard

Primary Examiner

6/5/04